

Appl. No. 10/762,164  
Reply to Advisory Action of May 17, 2006

Attorney Docket No. 2002-0246 / 24061.477  
Customer No. 42717

**Amendments To The Claims**

**Please cancel Claims 20-22 and 24-27 without prejudice. The following list of the claims replaces all prior versions and lists of the claims in this application.**

**Claims 1-27 (Canceled).**

**28. (Previously presented) At least one high-k device, comprising:**  
**a structure having a strained substrate formed thereover, the strained substrate comprising an uppermost strained-Si epi layer, a middle relaxed  $Si_{1-x}Ge_x$  layer and a lowermost graded  $Si_{1-y}Ge_y$  layer;**  
**at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and**  
**a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.**

**29. (Previously presented) The device of claim 28, the uppermost strained-Si epi layer having a thickness of from about 100 to 500Å; the middle relaxed  $Si_{1-x}Ge_x$  layer having a thickness of from about 1000 to 50,000Å; and the lowermost graded  $Si_{1-y}Ge_y$  layer having a thickness of from about 200 to 50,000Å.**

**30. (Previously presented) The device of claim 28, where  $x$  is greater than 0 and less than about 0.50 and where  $y$  is 0 or about 0 proximate the structure and increases to about  $x$  proximate the middle relaxed  $Si_{1-x}Ge_x$  layer, wherein  $x \geq y$ .**

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31. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
an uppermost strained-Si epi layer, a middle  $Si_{1-x}Ge_x$  layer and a lower silicon oxide  
layer;  
at least one dielectric gate oxide portion over the strained substrate, the at least one  
dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least  
one high-k device.

32. (Previously presented) The device of claim 31, wherein the uppermost  
strained-Si epi layer has a thickness of from about 100 to 500Å, the middle  $Si_{1-x}Ge_x$  layer  
has a thickness of from about 700 to 1200Å and the lower silicon oxide layer has a  
thickness of from about 800 to 2000Å.

33. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
an uppermost strained-Si epi layer over an upper relaxed  $Si_{1-x}Ge_x$  layer over a graded  
 $Si_{1-y}Ge_y$  layer over an epi layer over a lowermost relaxed  $Si_{1-z}Ge_z$  layer, wherein  $x \geq y \geq z$ ;  
at least one dielectric gate oxide portion over the strained substrate, the at least one  
dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least  
one high-k device.

34. (Previously presented) The device of claim 33, the uppermost strained-Si epi  
layer having a thickness of from about 100 to 500Å; the upper relaxed  $Si_{1-x}Ge_x$  layer  
having a thickness of from about 1000 to 50,000Å; the graded  $Si_{1-y}Ge_y$  layer having a  
thickness of from about 2000 to 50,000Å; the epi layer having a thickness of from about

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20 to 500Å; and the lowermost relaxed  $Si_{1-x}Ge_x$  layer having a thickness of from about 200 to 50,000 Å.

35. (Previously presented) The device of claim 33, the uppermost strained-Si epi layer having a thickness of from about 150 to 300Å; the upper relaxed  $Si_{1-x}Ge_x$  layer having a thickness of from about 2000 to 40,000Å; the graded  $Si_{1-y}Ge_y$  layer having a thickness of from about 500 to 25,000Å; the epi layer having a thickness of from about 50 to 200Å; and the lowermost relaxed  $Si_{1-z}Ge_z$  layer having a thickness of from about 500 to 25,000Å.

36. (Previously presented) The device of claim 33, where x is no less than y and less than about 0.50, where y is no less than z proximate the epi layer and increases to about x proximate the upper relaxed  $Si_{1-x}Ge_x$  layer, and where z is greater than 0 and less than about 0.50.

37. (Previously presented) The device of claim 33, wherein the at least one dielectric gate oxide portion being comprised of  $HfO_2$  or  $HfSiO_4$ .

38. (Currently amended) The device of claim 41, wherein the relaxed  $Si_{1-y}Ge_y$  layer has a thickness of from about 200 to 30,000Å, the constant  $Si_{1-y}Ge_y$  layer has a thickness of from about 200 to 20,000Å, the silicon epi layer has a thickness of from about 20 to 500Å, the constant  $Si_{1-z}Ge_z$  layer has a thickness of from about 200 to 20,000Å, and the uppermost strained-Si epi layer ~~has~~ has a thickness of from about 20 to 500Å.

39. (Previously presented) The device of claim 41, wherein the relaxed  $Si_{1-y}Ge_y$  layer has a thickness of from about 300 to 5000Å, the constant  $Si_{1-y}Ge_y$  layer has a

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thickness of from about 300 to 5000Å, the silicon epi layer has a thickness of from about 50 to 300Å, the constant  $Si_{1-x}Ge_x$  layer has a thickness of from about 300 to 5000Å, and the uppermost strained-Si epi layer has a thickness of from about 50 to 300Å.

40. (Previously presented) The device of claim 41, wherein the at least one dielectric gate oxide portion is comprised of  $HfO_2$  or  $HfSiO_4$ .

41. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising an uppermost strained-Si epi layer, a relaxed  $Si_{1-y}Ge_y$  layer under the uppermost strained-Si epi layer, a constant  $Si_{1-y}Ge_y$  layer under the relaxed  $Si_{1-y}Ge_y$  layer, a silicon epi layer under the constant  $Si_{1-y}Ge_y$  layer, and a constant  $Si_{1-x}Ge_x$  layer under the silicon epi layer, wherein the uppermost relaxed-Si epi layer is comprised of  $Si_{1-x}Ge_x$  wherein x is constant or graded;  
at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.